

Ontario. Cottage Pollution
Control Program.

1970 Cottage Pollution Control
Program : Otter Lake.

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ONTARIO DEPARTMENT OF HEALTH

ONTARIO WATER RESOURCES COMMISSION

OTTER LAKE

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As a result of recommendations contained in the March, 1970, report on Environmental Management of Recreational Waters in Cottage Areas in Ontario, a water quality survey of Otter Lake located in the District of Parry Sound was conducted by staff of the Ontario Water Resources Commission's District Engineers Branch during the period of August 24 to 28, 1970.

Staff of the Ontario Department of Health's Public Health Engineering Service had performed investigations of the on-shore private sewage disposal systems prior to 1970. Corrections to those systems found to be polluting are now being carried out.

The water met the OWRC bacteriological criteria for total body contact use (see appendix), with the geometric mean densities at most stations being as follows:

146 total coliform organisms per 100 ml.

2 fecal coliform organisms per 100 ml.

2 fecal streptococcus organisms per 100 ml.

Even the maximum geometric mean densities during the survey were well within the OWRC criteria. The location of the sampling points as well as the bacteriological results are shown on the appended maps. It will be noted that, at many stations, a single value was used for each bacteriological indicator organisms tested; this was possible since, according to the statistical evaluation performed by the OWRC's Bacteriology Branch, the bacterial densities at many of the stations were not significantly different from one another.

Thermal stratification of the waters, a natural occurrence in many lakes, was observed on August 25 at the three locations examined (Station 5A, 20 and 29).

The dissolved oxygen content in the surface waters was above the level designated by the OWRC for the preservation of biological life. Dissolved oxygen contents above the required level were detected at all depths at Station 5A (in Long Arm) and to within 15 to 20 feet of the lake bottom at Stations 20 and 29. The reduction in the dissolved oxygen near the bottom noted at all three stations, particularly Stations 20 and 29 is attributed to the oxygen demand of decomposing organic matter. Further studies beyond the scope of this survey would be required to determine whether the organic matter was induced by artificial or natural means.

The surface waters were found to be slightly acidic and low in mineral content, such quality being characteristic of lakes in the Precambrian Shield. The waters may be considered quite soft, with the hardness varying from 10 ppm to 16 ppm throughout the lake. The small section of the lake north of the CPR right-of-way (known locally as Little Otter Lake) had a slightly higher amount of dissolved minerals than elsewhere in the lake; the cause is not known but is probably natural.

BACTERIOLOGICAL INDICATOR ORGANISMS

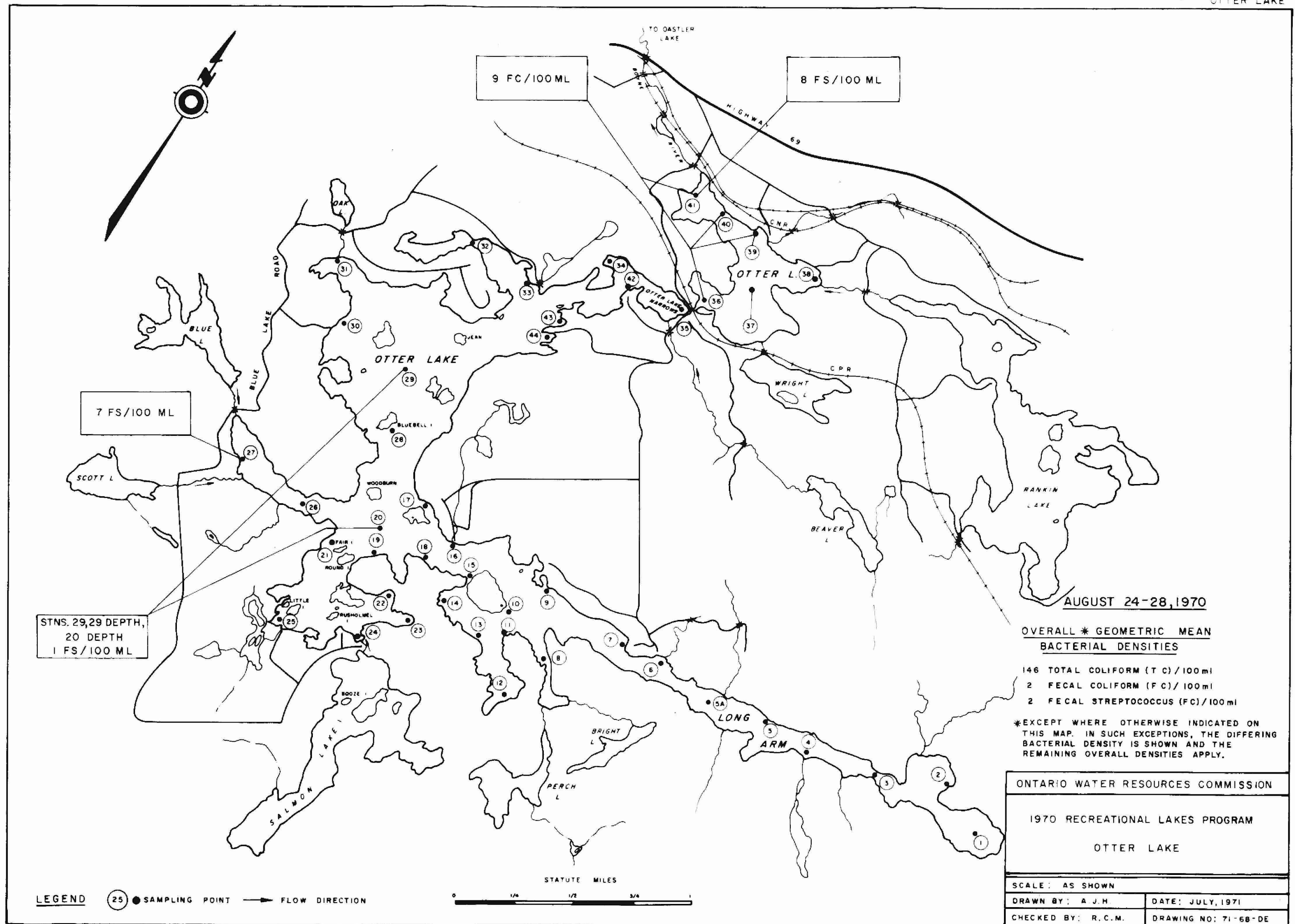
TOTAL COLIFORM organisms include a wide variety of bacteria ranging from the genus (group) Escherischia Coli (E. coli), which originate mainly in the intestines of man and other warm blooded animals, to the genera Citrobacter and Enterobacter aerogenes. The latter genera are basically found in soil but are also present in feces in small numbers. The presence of total coliforms in water may indicate soil run-off or, more important, less recent fecal pollution since organisms of the Enterobacter - Citrobacter groups tend to survive longer in water than do members of the Escherischia Coli group, and even to multiply when suitable environmental conditions exist.

The FECAL COLIFORM organisms are those coliform bacteria which are of intestinal origin and, therefore, are an indicator of recent fecal pollution. Most of the coliform bacteria found by the fecal coliform test are of the genus Escherichia Coli.

FECAL STREPTOCOCCI organisms are normal inhabitants of the large intestine of man and animals and generally do not multiply outside the human body. In waters polluted with fecal material, fecal streptococci are usually found along with fecal coliform bacteria but in smaller numbers. When the number of fecal streptococci bacteria approximates or is greater than the number of fecal coliform organisms, animals are the probable source.

The OWRC Guidelines and Criteria for Water Quality Management in Ontario (1970) indicate that water used for total body contact recreation can be considered impaired when the total coliform, fecal coliform, and/or fecal streptococcus geometric mean density exceeds 1000,100, and/or 20 per 100 ml, respectively.

NOTE: The term "geometric mean" refers to a type of average. Mathematically speaking, the geometric mean of a set of N numbers is the Nth root of the product of the numbers; in practice, it is computed by the use of logarithms.





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